IV. REFERENCE YEAR POPULATION, WASTE GENERATION AND WASTE REDUCTION

A. REFERENCE YEAR POPULATION AND RESIDENTIAL/COMMERCIAL WASTE GENERATION

As discussed in the previous chapters, the planning period for this plan is 15 years; that is, from January 1, 2009 to December 31, 2023.

Table 4-1 presents the reference year population for Holmes County Solid Waste Management District. The 2005 population census from the Ohio Department of Development, Office of Statistical Research (OSR), was used in preparing Table 4-1.

Ohio law requires the entire population of municipalities and villages located in more than one solid waste district to be added only to the district containing the largest portion of the jurisdiction's population. The major parts of the populations of the Village of Baltic and Village of Loudonville are in other Solid Waste Districts. As a result, these entire populations are included in the Stark-Tuscarawas-Wayne District, and Ashland County District, respectively. Therefore, the population projections for the part of Baltic and Loudonville in Holmes County were subtracted from the total County population projections to obtain the total district population.

The 2005 population of the part of Baltic in Holmes County was 107 according to the information obtained from the Ohio Department of Development. Population projections for future years were not available from the department. However, it was assumed that the population of the part of Baltic and Loudonville in Holmes County will grow in the same proportion as the County's population.

In view of the vigorous industrial growth as well as strong growth in housing construction in the last several years in the County, the Holmes County Planning Commission believes that the actual population growth in the County may be greater than that indicated by the OSR projections. However, this Plan is based on OSR projections only. Thus, the District's total population in reference year is 40,790 based upon the 2005 census excluding the villages of Baltic and Loudonville.

District population and waste generation rates are generally considered to be good parameters when determining and projecting the residential/commercial waste generation for a predominantly rural district such as Holmes County.

$$\frac{GR \times P \times 365}{2000} = \text{Residential/Commercial waste generation (TPY)}$$

where:

GR = generation rate (in pounds/person/day) calculated using Ohio EPA's September 4, 2002 recommendations for estimating per capita waste generation. For 2005, the per capita residential/commercial waste generation estimate was 4.74 pounds per person per day.

P = Population of the District
2000 = Conversion factor (converts pounds into tons)
365 = Conversion factor (converts days into years)
TPY = tons per year

This methodology estimated the District's residential/commercial waste generation was 35,285 tons in 2005. This estimate is 5,705 tons less than the residential/commercial waste generation of 40,990 tons recorded by landfills and transfer stations for 2005. With a corrected, actual population based on projections of the 2005 Census of 40,790 (excluding Baltic and Loudonville), this would indicate a 5.51 lb/person/day gross rate for Holmes County.

B. INDUSTRIAL WASTE GENERATION

An industrial survey was conducted by the Holmes County Coordinator in March-May 2006 to determine the quantity of industrial solid waste generated and recycled in the District in 2005. The results of the industrial waste survey are presented in Table 4-2. The District used information from industries responding to the survey as well as Appendix JJ of the Ohio EPA Plan format to estimate Total Industrial Waste Generated. A total of 50 industries were surveyed with 32 responding.

Within the Holmes County Solid Waste District not only are our survey responses less than 20 in each SIC Code, but we do not have 20 industries in any SIC category. Therefore, for the area titled "Survey Non-Respondents," the District reverted to Table JJ-2 as our guideline for determining total industrial waste generated.

The District had 49 industries in SIC codes 20 and 22 through 39. Approximately 36% (32) of the industries responded to the survey. With approximately 4,529 employees in these industries within the District, 3,429 of employees were represented by the survey results.

The District calculated the generation rate and tons of waste generated per employee for each SIC code from the survey respondents. The value was then used to calculate the tons generated from unreported industries in the same SIC code. For those SIC codes where no industries reported, the District used the generation rate from Appendix JJ of the Ohio EPA Plan format to estimate waste generated. A total of 18,776 tons of industrial waste was generated in the District. Approximately 45% was reported in the surveys.

C. EXEMPT WASTE

Table 4-3 shows the District's estimate of exempt waste generated in 2005. The District generates exempt waste such as construction and demolition waste. In 2005, 28,912 tons of waste of this classification was disposed.

D. TOTAL WASTE GENERATION

Table 4-4 presents the total waste generated in the District during the reference year using national statistics per Ohio EPA guidance. This includes residential/commercial waste represented in Table 4-1, the industrial survey results from Table 4-2, and the exempt waste reported by landfills from Table 4-3. For 2005, the calculated waste generation using national statistics, as presented in table 4-4 was 82,974 tons. The District generated a total of 196,528 tons in 2005 as represented in table 4-8 which included actual disposal plus reported recycling.

E. REFERENCE YEAR WASTE REDUCTION

Drop off Recycling Stations

The Holmes County Solid Waste District operates a system of 26 drop-off recycling sites and 2 privately-owned sites. The system of community drop-off sites was begun in 1992. These recycling sites are available for the residential and commercial recyclers in the District.

The current collection points are located at the following Holmes County sites and are serviced by District personnel:

Berlin (1)	Charm (1)	Clark (1)	Farmerstown (1)
Glenmont (1)	Holmesville (1)	Killbuck (1)	Lakeville (1)
Millersburg (2)	Mt. Hope (1)	Nashville (1)	Walnut Creek (1)
Winesburg (1)	Lake Buckhorn (1)	Recycling Center (1)	

There are also collection programs set up at four privately-operated facilities:

County Jail (1)	Pomerene Hospital (1)	Training Center (1)	County Home (1)

Six public school locations are also serviced:

Hiland High School	W. Holmes High School	Millersburg Elem.	West Holmes Jr. High
Killbuck Elementary	Clark Elementary		

Materials that can be recycled at these sites include cardboard, all types of papers including newsprint, aluminum, plastic, steel cans, and all glass. Materials from these locations are collected during regularly scheduled routes by the District.

The District continues to operate the current system of drop-off sites through the Plan period. The District monitors the productivity of the sites and adds or deletes sites when supported by need and the District's ability to service the facilities. Some District recyclables are received by privately owned, out-of-District recyclers who service larger commercial and industrial establishments. These items are primarily the high profit or high volume materials such as ferrous metal, aluminum, wood and cardboard.

The strengths of this program include:

- Accessibility 24 hours per day, seven days per week
- Key site selection which provides access to all county residents

The weaknesses of this program include:

- Unmanned allows residents to use for depositing trash
- Must be tightly scheduled for collection by the District
- Costly in terms of man-hours and collection equipment costs

Holmes County Recycling Center

The Recycling Center was closed as a processing facility by the District on April 17, 2001 due to budgetary and personnel constraints. The Center closed its processing function but continues its other functions. The operator of the Holmes County Landfill is a recycler in northeastern Ohio and western Pennsylvania. The landfill operator provides recycling processing for all of the District's recyclables. The District's collection program operates from the Recycling Center and houses its collection equipment.

The District continues to provide an outlet for all eight material groups designated to be highly amenable to recycling throughout the Plan period. Currently there is an outlet for seven categories of highly amenable recyclables through the system of community drop-off sites and privately owned recyclers.

Commercial, institutional and industrial entities in the District continue to utilize the District's drop-off sites as an outlet for recyclable materials. In addition, privately owned recyclers both inside and outside the District are used for high profit or high volume materials such as metal, aluminum, wood and cardboard.

The District's drop-off sites accept the following materials year round:

Corrugated cardboard	Office paper (all types)	Newspaper	Glass (all colors)
Steel cans	Aluminum cans	Plastic	

Voluntary Recycling Programs

The District continues to rely on promoting voluntary recycling within the residential and commercial community. This is accomplished by specific, targeted advertising, promotion, and educational outreach. There are important factors that will always restrict the District's ability to expand recycling strategies and programs beyond voluntary programs, not the least of which are our mostly rural setting and no municipality or township with mandatory recycling programs. The District does not anticipate any changes in these factors throughout the planning period.

Weaknesses of the program include:

- Holmes County is in the center of the World's largest Amish community. Well over one third of the District's population is Amish. Communication with the Amish community is always more difficult. The District has made vast inroads in the Amish parochial schools with its environmental education programs for the past five years. This is a slow process that builds with trust and confidence and moves at its own pace. Changing the ideas and priorities of the Amish community will always be a slow process.
- Transportation is a serious obstacle when planning any solid waste programs or special events. Recycling and HHW collection events even in strategic locations will always be difficult for the Amish community to participate in.

- Holmes County has only 5 incorporated municipalities. Millersburg is the largest with approximately 4,100 residents. Waste hauling in the District's incorporated communities is entirely by independent private haulers and is not contracted by the municipalities. Therefore, recycling strategies that are more aggressive than voluntary programs would be extremely difficult to implement and are not included in this Plan. The District continues to heavily educate and promote voluntary programs of waste reduction in the residential and commercial/industrial community.

The District continues to provide waste reduction information and assistance upon request primarily to commercial and industrial entities within the District. Waste reduction in the home is a large part of the awareness presentations provided by the District.

Education and Public Awareness to the Residential Sector

The District began educational programs in 1989 that included presentations to school children of all ages (both public and Amish parochial), public awareness through newspaper advertising and presentations to many adult community groups. The District utilized ODNR grant funds available through its Recycle Ohio Grant to employ a full-time Program Manager dedicated to this task. This position is now funded by the District since the discontinuance of ODNR grants. It is hoped that funding levels can be maintained to support this person.

The Program Manager is responsible for presentations, advertising, community awareness, recycling activities and promotions. The Program Manager is also responsible for organizing appliance round-ups, collection events, clean-up events, other community functions related to the implementation of the District Plan as well coordinating litter collection/prevention activities and Adopt-A-Highway programming.

Strengths of the program include:

- It is funded totally by ODNR's grant program
- Positives of this program lie in the aggressiveness and ingenuity of the Program Manager

Weaknesses of the program include:

- Continued funding via the grant process is always risky
- One individual is spread to thin to cover all aspects of the job in depth

Commercial/Industrial Sector Technical Assistance and Educational Programs

Implementation of recycling and waste reduction programs remains the responsibility of business and industry within the District. The majority of business owners or operators realize the economic advantage of recycling and waste reduction. As the District is in communication with these entities while conducting surveys, assistance will be offered when requested in the area of recycling and waste reduction.

In addition to voluntary programs, the District provides the following programs to assist commercial, institutional, and industrial recycling and waste reduction during the current planning cycle:

a. Supplies private recycling providers names to large generators that the District may not be able to service effectively.

b. Assists businesses and residents in identifying private outlets for recyclable materials.

c. In several instances the District provides reasonably-priced collection services from business sites to the Recycling Center. These are very few in number, and as our supply of collection bins got more fully utilized at community drop-off sites, this service will be referred to private recycling providers. In 2005, the District provided collection services to four commercial facilities. These services will be phased out over the next two years.

d. Provides office paper recycling program for 36 County government offices via routine bin collection. Facility custodians collect materials from throughout the buildings and place them in District bins. District personnel collect these materials as per their scheduled routes.

e. Provides waste audits to interested commercial and industrial enterprises upon request. Most requests come from the commercial sector where tighter cost efficiency is needed. Most industrial enterprises have sufficient expertise on staff to audit and control waste generation and utilize recycling efforts.

f. Provides hot line services whereby answers to questions can be provided quickly whether the query is about general recycling, solid waste issues, litter collection/prevention, HHW or landfill questions.

Strengths to the program include:

- District provides quick and practical responses to questions
- Places responsibility for waste reduction strategies on individual entities which directly affects balance sheets

Weaknesses of the program include:

- Limited response from industry for waste audits or other assistance.

Litter Collection, Recycling and Environmental Education

The District continues to provide education outreach, organization and implementation of very successful litter collection and stewardship programs.

Educational programs reach school children and community groups promoting litter collection and stewardship. In addition, our successful Adopt-a-Road program is organized through the District as well as river sweeps and other annual collection events.

The quarterly newsletter *Green Team* was, for seven years, published in conjunction with the Holmes County Soil and Water District. Starting in 2001, the *Green Team* newsletter was published by the District's program manager. The Soil and Water District received very few requests from schools for presentations, thus they decided to go another direction as part of their education outreach programming.

This is an environmental newsletter promoting stewardship of the earth and the environment. It is available to all school teachers, aides, and administrators as well as home schoolers and Amish parochial schools. This resource publication presents tasks, games, lesson plans, units of study, curriculum guides, and lists of resources and websites available to educators. Starting in 2000,

distribution took place through the school's district offices. Amish parochial teachers receive their copies via their bishop superintendents. This resource is promoted through their central administrative offices.

Strengths of the program include:

- Continuous, regular communication with constituents
- Program breadth includes students, parents, teachers, administrators
- Adopt-a-Road programs are very visible and self-promoting

Weaknesses of the program:

- Quarterly newsletter has gone electronic because distribution costs are prohibitive.

Scrap Tire Management Program

Currently, there are no known significant tire dumps in the District. Therefore, the resources of the District have been directed towards providing information and awareness for the proper disposal of scrap tires and providing an outlet for residential generators of scrap tires. The District uses the following strategies as part of its scrap tire management plan:

- The District provides information as part of public awareness regarding the proper disposal of scrap tires. The District maintains an updated list of authorized scrap tire facilities and scrap tire transporters that is distributed upon request to generators of scrap tires.
- The District responds to requests by the County Health Department to coordinate efforts ensure compliance with the scrap tire regulations. Monitoring of scrap tire dumping and any necessary enforcement is coordinated with the Health Department. In the event that tire dumping occurs in the District, the entity responsible will be ordered to remediate at their own expense. When a responsible party cannot be identified, the District provides funding for scrap tire clean up if funds are available. Scrap tire clean-up projects and funding is on a case-by-case basis.
- The Holmes County Sanitary Landfill continues to be the collection facility for scrap tire. Tires collected at the Holmes County Sanitary Landfill are transported via a licensed scrap tire transporter to an approved tire disposal facility. During 2005, no tires were disposed of from the Holmes County Landfill
- The District sponsors special tire collection days. These events provide an opportunity for residents of the District to properly dispose of scrap tires. The goal of the District is to provide this service at minimum cost to residential customers for up to 10 tires per collection event throughout the Plan period. During 2005, 13 tons of tires were transported and recycled by Liberty Tire from this collection.

Local governments and public institutions participate in tire collection events and all HHW collection events at no cost in order to provide for these entities to dispose of illegally dumped scrap tires collected along roadsides and on other public property. Disposal costs are paid by the District.

Commercial businesses, industrial businesses and private institutions located within the District participate in tire collection events and HHW collection events. The District provides a convenient method for collection and disposal for these entities. Scrap tires are accepted with a

charge no greater than "at cost". All tires collected by any of the District's methods are certifiably recycled.

Household Hazardous Waste Programs

The District provided education and awareness programs on the issue of HHW. Presentations by the District include HHW education. Throughout the Plan period, the District provided advertising on the issue of HHW. The District distributed 318 HHW identification wheels that present alternatives to hazardous products as well as the hot line number for questions concerning HHW. The District provided a hot-line throughout the Plan period to fielded 12 questions concerning the proper handling and disposal of HHW and alternatives to hazardous products. The District conducted its first HHW/pesticide collection event on June 24, 1997. This event was held in cooperation with the District, the County Extension Service and the Ohio Dept. of Agriculture (ODA). The District is heavily agricultural and the need to provide pesticide/herbicide disposal for farmers was very evident in the first collection event. The ODA provided a very cost effective joint effort for pesticide/herbicide collection and disposal. The District now provides this service by itself.

The District conducted HHW collection events on a triennial basis throughout the Plan period. This program combines HHW Collection events with HHW educational outreach programming. A collection event was held in 2006 serving 127 households and collected 13.38 tons of materials.

Strengths of this program include:

- The entire District is serviced by this program
- Nearly 50 tons of HHW and pesticides are kept out of our landfills with much of it being recycled.

Weaknesses of this program include:

- The extreme cost of the program impacts other environmental programs

Yard Waste Management

The District provides education and awareness on the issue of the yard waste ban at landfills. Presentations by the District include yard waste and composting activities. Throughout the Plan period, the District provides advertising and awareness on the issues of yard waste.

The District distributed brochures entitled *"Guide to Backyard Composting and Other Ways to Recycle Organic Waste at Home"* to groups. Approximately 280 copies of this brochure were distributed in 2005. The rural setting of the County allows for successful management of yard waste with a "Don't Bag It!" approach. As long as residents are reminded through the media that yard waste does not belong in the trash, most residents of the District have room to land apply or compost. No yard waste was deposited in the County landfill during 2005.

The District cooperates with and assists any municipality or private entity that expresses an interest in establishing or maintaining a properly licensed commercial composting facility within the District. Several instances occurred in the past two years where communities explored the possibilities of starting a composting facility; however, it appeared to be not feasible monetarily. During the Plan period, the District has no plans to establish a composting facility.

Strengths of this program include:

- ❑ Allows homeowners various options including land application practices.
- ❑ Many homeowners and gardeners to compost which is our desired end result.

Lead-Acid Battery and Used Oil Programs

The Holmes County Recycling Center currently provides year round acceptance of lead-acid batteries at no cost to the generator. This will remain in effect throughout the Plan period. Batteries are properly recycled by the Center through a private recycling company.

The District has several private entities that accept used oil from do-it-yourself oil changers. The District receives many calls per year concerning used oil and these parties are directed to private businesses that handle used oil. Used oil is only collected at the District's HHW events. The District does not collect used oil as part of its normal recycling program on a daily basis.

The District implemented with this Plan a proposal to provide used oil collection and disposal as well as lead-acid battery collection and recycling in conjunction with bi-annual scrap tire amnesty collection events started in 1997. Used oil, batteries and scrap tires have a natural relationship that assists in generating attention and participation with these planned events.

Strengths of this program include:

- ❑ This program services the entire county on a regular basis.
- ❑ Lead-acid batteries are accepted year around at our collection sites.
- ❑ Keeps used oil off the dirt roads and lanes, and out of our ground water sources.

Weaknesses of this program:

- ❑ Cost continues to rise and will impact other programs.

White Goods (Appliances) Management

The District provides for year-round acceptance of white goods (appliances) at no charge to the generator. This program will continue throughout the Plan period. White goods accounted for approximately 3.2% of our residential recycling figures in 2005. Thus, 238 tons of white goods were kept out of the landfill and were nearly 100% recyclable.

When the Recycling Center's processing unit closed in 2001, white goods continued to be collected at a single site. This site services the entire county 24/7. In addition, during the District's annual Spring Cleanup event, special white goods collections take place in the villages of Millersburg and Glenmont. These special drives are conducted in these locals because of their inconvenient distances from our primary white goods collection location. When the Recycling Center closed, the drop-off site for all appliances and other metals was switched to the Holmes County landfill. Forty-yard roll-offs are utilized to collect and store these items before being transported to our recycler.

Strength of the program include:

- ❑ Services the entire Solid Waste District
- ❑ 238+ tons of appliances are kept out of the landfill and recycled

Weaknesses of the program:

- The program is not funded by special grants, and commodity prices are very poor. Therefore another strain is placed on the District's budget.

Electronics Recycling Programming

The District instituted an electronics recycling program in 2004. There are several ways in which the general public and even businesses can recycle their old electronic items: (1) by prearranging a time they can bring their items to the Recycling Center where they are turned in, weighed, labeled and eventually transported to our contracted recycler, and (2) these items can be brought to our HHW events. In both instances, the customer is charged 25-cents per pound for handling and transporting. The District contracts with RET3, an electronics recycler from Cleveland, to handle our electronics including television sets.

Throughout the year at presentations, the county fair and specific media advertising events, the recycling of electronics is promoted to the general public. During 2005, the District handled 24.8 tons of electronics which were recycled. For larger quantities and for industries, the District refers our recycler directly to them.

F. TOTAL WASTE GENERATION: HISTORICAL TRENDS OF DISPOSAL PLUS WASTE REDUCTION

Table 4-7, "Total Waste Generation Based Upon Disposal Plus Waste Reduction," compiles data from the District Annual Reports and the Ohio EPA Facility Data Reports. The 2005 Annual District Report shows a source reduction and recycling figure of 130,813 tons. This is a 19.2% increase over the 2000 figures of 109,760 tons.

Table 4-7 also includes a six-year comparison of waste generation and disposal. The total waste generation has increased 52.5% from 138,083 tons in 2000 to 196,528 tons in 2005.

G. RECONCILIATION OF WASTE GENERATION

Table 4-8 presents the adjusted reference year total waste generated in the District. The adjusted reference year total waste generation for the District was 196,528 tons. The District residential/commercial waste generation was 40,990 tons and industrial waste generation was 126,626 tons. The District used landfill records for disposal figures plus recycling data to estimate waste generation. The District has chosen to use the waste generation data as calculated in table 4-8 instead of 4-4 as a basis for all future projections. This decision is based on the general reliability of the data from actual disposal and reported recycling from all sectors versus the national statistics that do not represent Holmes County's demographics and waste generation.

The District estimated the residential/commercial waste stream composition in Table 4-9 using the national averages in Appendix KK of the Ohio EPA Plan Format.

The industrial waste composition included in Table 4-10 was based on the 2005 Industrial Waste surveys.

H. WASTE COMPOSITION

1. Residential and Commercial Waste Sectors

The District estimated the residential/commercial waste stream composition in Table IV-9, "Estimated Residential/Commercial Waste Stream Composition for the District for the Reference Year", using the national averages for 2000 in Appendix KK of the Ohio EPA Plan Format. The largest component of the residential/commercial waste stream is projected to be other paper at 16% (6,640 tons) followed by cardboard at 14% of the waste stream and appliances, durables and furniture at 14%.

2. Industrial Waste Sector

The solid waste composition for the industrial sector was estimated by modifying composition percentages obtained from Appendix JJ of the Plan. The calculations for the composition percentages are provided in Table 4-10. These percentages were modified based upon industrial recycling composition percentages. For example, the wood composition percentage had to be increased to 16.15%. As a result of this large increase in wood composition, the sludge, stone/clay/sand compositions were each decreased. Ash composition was decreased by 2%. Table 4-10 presents the resulting industrial solid waste composition.

Table IV-1
Reference Year Population and Residential/Commercial Generation

County/Community Name	2005 Population		2005 Generation Rate (lbs/person/day)	2005 District Residential/Commercial Generation (Tons)
	Before Adjustment	After Adjustment		
Holmes County	40,980	40,790	4.74	
Baltic	(107)			
Loudonville	(83)			
Total		**40,790**		**35,285**

Source:
Population- The population figures are derived from the 2005 ADR form
Adjustments: Baltic has less then 50% of the population living in Holmes County and more then 50% living in Tuscarawas County. The population of this community is therefore subtracted from the District totals. Loudonville has less then 50% of the population living in Holmes County and more then 50% living in Ashland County. The population of this community is therefore subtracted from the District totals.

Example Calculation:

$$\text{Residential/Commercial Waste Generation (tons)} = \frac{\text{Population x National Generation Rate x 365 days/year}}{\text{2,000 pounds/ton}}$$

$$40{,}869 = \frac{40{,}790 \times 4.74 \times 365}{2000}$$

Table IV-2
Industrial Waste Generation Survey Respondents vs. Unreported

Standard Industrial Classification Category (SIC)	Survey Respondents				Amounts Based Upon Secondary Data (Unreported)				Total Industrial Waste Generated (Tons)
	# of Industries	# of Employees	Tons of Waste Generated	Generation Rate (T/employee)	# of Industries	# of Employees	Generation Rate (T/employee)	Tons of Waste Generated	
20	4	183	625	3.42	1	550	13.92	7,656	8,281
22	0	0	0	0	0	0	9.99	0	0
23	0	0	0	0	0	0	2.80	0	0
24	15	1,125	3,076	2.73	0	0	51.62	0	3,076
25	1	260	113	0.43	0	0	1.79	0	113
26	1	160	970	6.06	0	0	17.50	0	970
27	1	35	133	3.80	0	0	6.70	0	133
28	0	0	0	0	0	0	12.43	0	0
29	0	0	0	0	0	0	7.33	0	0
30	9	973	2,171	2.23	0	0	7.29	0	2,171
31	1	250	64	0.26	0	0	3.41	0	64
32	3	100	380	3.80	0	0	10.55	0	380
33	2	42	14	0.33	0	0	36.93	0	14
34	2	165	501	3.04	0	88	11.16	982	1,483
35	4	102	358	3.51	4	77	5.72	440	798
36	1	17	63	3.71	3	291	2.98	867	930
37	0	0	0	0	2	72	3.21	231	231
38	5	17	30	1.76	0	0	1.74	0	30
39	0	0	0	0	6	22	4.62	102	102
N/A	0	0	0	0.00	0.00	0.00	0.00	0	0
Total	**49**	**3,429**	**8,498**	**2.48**	**16**	**1,100**	**n/a**	**10,278**	**18,776**

Source:
Number of employees was determined from the 2005 Industrial Waste Survey
Unreported number of industries and number of employees is from the non-respondent industrial waste survey
Unreported Generation Rate is from the District Solid Waste Management Plan Format (1994) Table JJ-2

Generation Rate (Survey Respondents) = tons of waste generated / number of employees
Waste Generated (unreported) = number of employees x generation rate
Total Waste Generated = waste generated (survey respondents) + waste generated (unreported)

Example Calculations:

Survey Respondent $3.42 = \frac{625}{183}$ Generation Rate = $\frac{\text{Waste Generated}}{\text{\# of Employees}}$

Non-Respondents 7,656= 550 x 13.92 Tons of Waste Generated = # of Employees x Generation Rate (T/employee)

8,281= 625 + 7,656 Total Industrial Waste Generated = Total Reported + Total Unreported

Table IV-3
Exempt Waste Generated in the District and Disposed in Publicly Available Landfills

Type of Waste Stream	Generation Rate (lb/person/day)	Total Exempt Waste Generation (TPY)
C&D Waste; Asbestos	3.88	28,912
Total	3.88	**28,912**

Source:
2005 Annual Solid Waste Reports/Table III-1

$$\text{Generation Rate (lbs/person/day)} = \frac{\text{Total Exempt Waste (tons/yr) x 2,000 (lb/ton)}}{\text{Population x 365 days/yr}}$$

Example Calculation:

$$3.88 = \frac{28{,}912 \times 2{,}000}{40{,}790 \times 365}$$

Table IV-4
Reference Year Total Waste Generation for the District

Type of Waste	Generation Rate (lbs/person/day	Tons/Year
Residential/Commercial	4.74	35,285
Industrial	2.52	18,776
Exempt	3.88	28,912
Total Waste Generation	**11.15**	**82,974**

Source:
Residential/Commercial- Table IV-1
Exempt -Table IV-3
Industrial- Tons/yr-Table IV-2
Industrial- Genearation Rate calculated using the following equation

$$\text{Generation Rate (lbs/person/day)} = \frac{\text{Total Industrial Waste (tons/yr) x 2,000 (lb/ton)}}{\text{Population x 365 days/yr}}$$

Sample Calculation:

$$2.52 = \frac{18{,}776 \times 2{,}000}{40{,}790 \times 365}$$

Table IV-5
Reference Year Residential/Commercial Waste Reduction in the District

Type of Waste Source Reduced	TPY	Type of Waste Recycled	TPY	Incineration, Composting, Resource Recovery		
				2005 Total Waste Received	2005 Residual Landfilled	2005 Net Waste Reduced
None	0	Cardboard	1,937	Incineration*	Ash	Net Incineration*
		Office Paper	2,899	0	0	0
		Wood	0	Composting	Residuals	Net Compost
		Non-Ferrous	589		0	0
		Ferrous Metals	349	Resource Recovery	Ash	Net Resource
		Rubber	0	0	0	0
		Plastics	693			
		Glass	657			
		White Goods	238			
		* HHW	0			
		Lead-Acid Batter.	2			
		* Used Oil	0			
		Scrap Tires	0			
		Sludge	0			
		Electronics	25			
Subtotal	**0**		**7,389**	**0**	**0**	**0**
Grand Total						**7,389**

Source:
2005 District Annual Report

Table IV-6
Reference Year Industrial Waste Reduction in the District

Type of Waste Source Reduced	TPY	Type of Waste Recycled	TPY	Incineration, Composting, Resource Recovery		
				2005 Total Waste Received	2005 Residual Landfilled	2005 Net Waste Processed
None	0	Cardboard	6,693	Incineration*	Ash	Net Incineration
		Other Paper	6,621	0	0	0
		Wood	102,296	Resource Recovery	Ash	Net Resource
		Non-Ferrous	316	0	0	0
		Ferrous Metals	4,025	Composting	Residuals	Net Composted
		Rubber	564	0	0	0
		Plastics	2,601			
		Glass	297			
		Food	0			
		Non-Exempt Foundry	6			
		Asphalt	0			
		Electronics	0			
		Sludge	0			
		Textiles	5			
Subtotal	0		**123,424**	**0**	**0**	**0**
Grand Total						**123,424**

Source:
2005 District Annual Report

Table IV-7
Total Waste Generation Based Upon Disposal Plus Waste Reduction

Year	Management Method Used (TPY)						Total Waste
	Source Reduction & Recycling	Yard Waste Composting	Yard Waste Land Application	Incineration Waste Reduction	MSW Composting	Landfill Disposal	
2000	109,760	0	0	0	0	28,323	138,083
2001	111,477	0	0	0	0	44,158	155,635
2002	110,996	0	0	0	0	46,927	157,923
2003	112,563	0	0	0	0	54,656	167,219
2004	115,961	0	0	0	0	70,031	185,992
2005	130,813	0	0	0	0	65,715	196,528

Source:
District Annual Reports and Ohio EPA Facility Data Reports.

Table IV-8
Adjusted Reference Year Total Waste Generation for the District

Type of Waste	Generation Rate (lbs/person/day)	Tons/Year
Residential/ Commercial	5.51	40,990
Industrial	17.01	126,626
Exempt	3.88	28,912
Total Waste Generation	**26.40**	**196,528**

Source:
Exempt -Table IV-3
Residential/Commercial and Industrial - Tons/year : Tons/ year waste reported by the landfills (Table III-1) + Recycling (Table IV-5 or Table IV-6)

Example Calculation:

$$\text{Generation Rate (lbs/person/day)} = \frac{\text{Total Waste (tons/yr) x 2,000 (lb/ton)}}{\text{Population x 365 days/yr}}$$

$$17.01 = \frac{126{,}628 \times 2{,}000}{40{,}790 \times 365}$$

Table IV-9
Estimated Residential/Commercial Waste Stream Composition for the District for the Reference Year

Waste Stream Type	Percentage of the Waste Stream	Tons
Aluminum	1.0%	410
Appliances, Durables, Furniture	13.9%	5,698
Cardboard	14.2%	5,821
Clothing	2.6%	1,066
Ferrous Metals	1.4%	574
Food	6.4%	2,623
Glass	5.7%	2,336
Lead-Acid Batteries	9.0%	3,689
Newspaper	6.0%	2,459
Office Paper	3.9%	1,599
Other Paper	16.2%	6,640
Plastics	6.5%	2,664
Scrap Tires	1.8%	738
Yard Waste	10.2%	4,181
Other	1.2%	492
Totals	**100.0%**	**40,990**

Source:
Percentage of the waste stream from national averages in Appendix KK of District Solid Waste Management Plan Format (1996)

Table IV-10
Estimated Industrial Waste Composition for the Reference Year in the District

Waste Stream Type	TPY	Waste Stream Type	TPY	Waste Stream Type	TPY
Paper	6,848	Wood	102,296	Plastics	4,748
Cardboard	6,693	Ferrous Metals	4,025	Rubber	883
Fabrics and Cloth	5	Non-Ferrous Metals	316	Stone/Clay/Sand	6
		Glass	805	General Solid Waste	1
Subtotal	13,546	**Subtotal**	107,441	**Subtotal**	5,638
Grand Total					**126,626**

Source:
District Industrial Waste Survey for calendar year 2005 solid waste generation by type of waste and SIC number.
Each industrial waste component was projected using the adjustment factor to account for nonrespondent industries.